

# PATENT SPECIFICATION

(11) 1202238

1202238

## DRAWINGS ATTACHED

- (21) Application No. 42664/67 (22) Filed 19 Sept. 1967
- (31) Convention Application No. C 40893 X/39a<sup>c</sup>
- (32) Filed 6 Dec. 1966 in
- (33) Germany (DT)
- (45) Complete Specification published 12 Aug. 1970
- (51) International Classification B 29 h 17/16
- (52) Index at acceptance B7C 74E6



## (54) IMPROVEMENTS IN OR RELATING TO TYRE BUILDING MACHINES

(71) We, CONTINENTAL GUMMI-WERKE AKTIENGESELLSCHAFT, of Continental-Haus/Postfach 169, Hannover, Germany, a German Body Corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to a tyre building machine of the kind comprising a building drum, having an inflatable diaphragm made of resilient material which is fastened at its edges to end walls, the mutual spacing of which is variable in such a way that they are evenly spaced from the mid circumferential plane of the drum in every setting.

With known building machines of this kind, the previously mentioned end walls of the drum are supported by telescopically-interfitted tubes, which are separately slidable on the drum shaft.

The invention is concerned with the problem of simplifying the positioning of the end walls and of producing a building machine such that it is especially suitable for the insertion of detachable, interchangeable drums.

According to the invention, a tyre building machine comprises a building drum having an inflatable diaphragm made of resilient material which is fastened at its edges to end walls, the mutual spacing of which is variable in such a way that the end walls are evenly spaced from the mid-circumferential plane of the drum in every setting, wherein one end wall is attached to one end of a shaft for rotatably driving the drum, by means of a tubular hub co-axial with the shaft, for axial and rotary movement with the shaft and the other end wall is mounted for axial movement relative to and rotary movement with the hub, means being provided for simul-

taneously axially moving the shaft and the hub and the end wall attached thereto in one direction and the other end wall in the opposite direction symmetrically with respect to the mid-circumferential plane of the drum.

An alteration in the spacing between the two end walls of the drum, which serves the purpose of expanding or altering the drum contour, is consequently effected by an axial movement of the shaft and the end wall mounted thereon on the one hand, and an axial movement of the other end wall relative to the shaft, on the other. Consequently, additional bearings or tubing members for the other end wall of the drum are not required.

This hub can be detachably mounted on the free end of the drum shaft. Nevertheless, it is possible to bring about the previously-mentioned movement of the two end walls of the drum symmetrically in the same or opposite directions in relation to the mid-circumferential plane of the drum. The end wall firmly fixed on the hub is moved by a longitudinal movement of the drum shaft, whilst the other end wall movably mounted on the hub is moved in the direction of the other end wall, or in the opposite direction, by driving members present in the tyre building machine. In order that the drum in such a machine can be removed in its entirety, the hub is detachably connected to the shaft.

Further features of the invention are explained below with reference to the accompanying drawing, in which an embodiment is shown by way of example, the single figure being a diagrammatic cross-section of a tyre building machine.

A drum shaft 1, which is supported at one end in a frame 2, is mounted for longitudinal movement on the frame 2 of the machine. The drum shaft 1 has, at its free end 3, a bearing surface limited by a collar 4, for

[Price 5s. Od. (25p)]

- the attachment of a hub 5 of a building drum, which hub has a fixed end wall 6 on the end of the hub 5 facing away from the machine frame 2 and an axially movable end wall 7 on its end facing the machine frame 2. The two end walls 6, 7, are used for securing the edges of a flexible inflatable diaphragm 8, which is supported by struts as indicated at 9. The building drum is thus guarded against any accidental removal from the shaft by a lock ring 10.
- A shaft 11 is mounted on the machine frame which shaft can be turned by a driving means 12 and has threaded portions 13, 14, at opposite ends, with one threaded portion having a left-hand thread and the other a right-hand thread both threaded portions having the same pitch. The threaded portion 13 fits into a driving disc 15 which in turn fits freely into a circumferential groove 16 upon the drum shaft 1, whilst the threaded portion 14 is drivingly connected to an axially movable tube 17, which is provided, at the end facing the end wall 7, with hooks 25 which lock into the end wall 7.
- Because of the shaft 11, the two end walls 6, 7 can be moved simultaneously equal distances in opposite directions on actuation of the driving means 12, wherein the end wall 7 is moved by the tube 17 and the end wall 6 is moved by the drum shaft 1 which undergoes a corresponding axial movement so that the end walls are always equally spaced from the drum mid-circumferential plane.
- The hooks 18 which fit into a circumferential groove 19 in the end wall 7 are under the action of springs (not shown), which tend to remove the hooks 18 from the groove 19.
- Engagement of the hooks 18 is nevertheless ensured whenever they are enclosed by a further, likewise axially-moveable, tube 20. By movement of the tube 20 in the direction towards the machine frame, the hooks 18 can thus be disengaged and by its movement in the opposite direction, they can be brought into the operative position.
- Recesses 21 are provided on the inside of the end wall 7 for engagement by projections on an annular member 22 to form a bayonet-like connection. The engagement of the recesses and the projections locks the end wall 7 so as to prevent axial movement of the end wall 7 relative to the hub 5. The member 22 is mounted on the hub 5 so as to be rotatable to allow engagement and disengagement of the recesses and projections co-axial with the shaft 1.
- The rotation of the member 22 is caused by a ring 23 co-axial with the shaft 1. The ring 23 is movable axially so as to contact the member 22 and has end surfaces 23a which engage with end surfaces 22a of the member 22 such that rotation of the ring 23 in either direction causes rotation of the member 22.
- If the end wall 7 is immovably connected to the hub 5 by the member 22, the hooks 18 are lifted out from the groove 19 due to the movement of the tube 20 and furthermore, if the ring 10 is released, the building drum can thus be withdrawn from the drum shaft 1, even if the space surrounded by the inflatable diaphragm 8 is under pressure.
- The shaft 1 is rotated by means of an axially fixed wheel 24, and in order to provide rotation regardless of the axial position of the shaft 1, a key 25 is provided engaging in a longitudinal slot 26 in the shaft 1.
- WHAT WE CLAIM IS:—**
1. A tyre building machine comprising a building drum having an inflatable diaphragm made of resilient material which is fastened at its edges to end walls, the mutual spacing of which is variable in such a way that the end walls are evenly spaced from mid-circumferential plane of the drum in every setting, wherein one end wall is attached to one end of a shaft for rotatably driving the drum, by means of a tubular hub co-axial with the shaft, for axial and rotary movement with the shaft and the other end wall is mounted for axial movement relative to and rotary movement with the hub, means being provided for simultaneously axially moving the shaft and the hub and the end wall attached thereto in one direction and the other end wall in the opposite direction symmetrically with respect to the mid-circumferential plane of the drum.
  2. A tyre building machine as claimed in claim 1, in which the hub is detachably mounted on the shaft.
  3. A tyre building machine as claimed in claim 2, in which the axial movement of the other end wall relative to the hub is preventable by a releasable bayonet connection between the hub and the said other end wall.
  4. A tyre building machine as claimed in claim 3, in which the bayonet connection is provided by recesses in the other end wall and projections on an annular member rotatably mounted on the tubular hub and engageable in these recesses.
  5. A tyre building machine as claimed in claim 4, having an axially and rotatably moveable ring co-axial with the shaft, one end of the ring being arranged to engage the annular member to connect and disconnect the bayonet connection by rotation of said ring.
  6. A tyre building machine according to any preceding claim in which hooks engageable in the other end wall for transmitting axial movement to the said other end wall from the means for simultaneously moving the shaft and the hub in one direction and the said other end wall in the opposite direc-

tion, are removable from the other end wall by spring action and are moved into engagement with said other end wall by external application of an axially movable tubular member.

5 7. A tyre building machine, substantially as hereinbefore described with reference to the accompanying drawing.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1970.  
Published by The Patent Office, 25 Southampton Buildings, London WC2A 1AY. from  
which copies may be obtained.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

